THE CLASSIFICATION OF THIS
PUBLICATION HAS BEEN CHANGED FROM
RESTRICTED TO UNCLASSIFIED

AN 16-30CRC7-2

SHPG
B-5

Handbook
of
Operating Instructions
for
MODEL AN/CRC-7
VHF SEARCH AND RESCUE
TRANSMITTER-RECEIVER

PUBLISHED UNDER JOINT AUTHORITY OF THE COMMANDING GENERAL,
ARMY AIR FORCES AND THE CHIEF OF THE BUREAU OF AERONAUTICS

THE CLASSIFICATION OF THIS PUBLICATION HAS BEEN CHANGED FROM RESTRICTED TO UNCLASSIFIED

AN 16-30CRC7-2

Handbook
of
Operating Instructions
for
MODEL AN/CRC-7
VHF SEARCH AND RESCUE TRANSMITTER–RECEIVER

PUBLISHED UNDER JOINT AUTHORITY OF THE COMMANDING GENERAL, ARMY AIR FORCES AND THE CHIEF OF THE BUREAU OF AERONAUTICS

30 June 1945
Revised 15 August 1946

Reproduction of the information or illustrations contained in this handbook or catalog is not permitted without specific approval of the issuing service (War or Navy Department).

LIST OF REVISED PAGES ISSUED

NOTE.—A heavy black vertical line, in the outer margin of revised pages (the left margin for left-hand columns, and the right margin for right-hand columns) indicates the extent of the revision. This line is omitted where more than 50 percent of the page is revised. A black horizontal line to the left of the page numbers listed below indicates pages revised, added or deleted by current revision. The line is used only on second and subsequent revisions.

Page No.	Latest Revision Date
1-0	15 August 1946
1-1	15 August 1946
2-1	15 August 1946
4-2	15 August 1946
5-1	15 August 1946

BuAer

ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED AS FOLLOWS:

AAF ACTIVITIES. In accordance with T. O. No. 00-5-2, base Air Inspectors, Technical will submit requisitions (AAF Form 104B) to:

Commanding General
Fairfield Air Technical Service Command
Patterson Field
Fairfield, Ohio
Attn: Publications Distribution Branch

NAVY ACTIVITIES.—Submit requests to nearest supply point listed below, using form NavAer—140.

NAS, Alameda, Calif.: ASD. Guam: NAS, Jacksonville, Fla.: NAS, Norfolk, Va.: NASD, Oahu: NASD, Philadelphia, Pa.: ASD, Samar Leyte: NAS, San Diego: NAS, Seattle, Wash.

For complete listing of available material and details of distribution see Naval Aeronautic Publications Index, NavAer 00-500.

TABLE OF CONTENTS

SECTION I — GENERAL DESCRIPTION

Paragraph		*Page*
1.	Function of Equipment	1-1
2.	Equipment Supplied	1-1
3.	Equipment Required but not Supplied	1-1
4.	Power Consumption	1-1
5.	Description of Equipment	1-1

SECTION II — INSTALLATION AND ADJUSTMENT

1.	Battery Installation	2-1
2.	Test Procedure	2-1

SECTION III — OPERATION

1.	Preparation for Operation	3-1
2.	Receiving Signals	3-1
3.	Transmitting Voice Signals	3-1
4.	Transmitting Tone	3-1

SECTION IV — SUPPLEMENTARY DATA

4-1

SECTION V — EMERGENCY OPERATION AND REPAIR

1.	Removal of Battery	5-1
2.	Checking Batteries	5-1
3.	Maintenance	5-1

LIST OF ILLUSTRATIONS

Figure		*Page*
1-1	VHF Sea Rescue Transmitter — Receiver, Model AN/CRC-7, Components	1-0
3-1	VHF Sea Rescue Transmitter — Receiver, Model AN/CRC-7, Operating Controls	3-1
3-2	VHF Sea Rescue Transmitter — Receiver, Model AN/CRC-7, Operating Instructions	3-1
4-1	VHF Sea Rescue Transmitter — Receiver, Model AN/CRC-7, Outline Dimensions	4-2
4-2	VHF Sea Rescue Transmitter — Receiver, Model AN/CRC-7, Schematic Wiring Diagram	4-3

LIST OF TABLES

Table No.		*Page*
1-1	Equipment Supplied	1-1
1-2	Equipment Required but not Supplied	1-1
1-3	Battery Power Consumption	1-1

REPORT OF FAILURE

FOR U. S. ARMY AIR FORCE PERSONNEL:

In the event of malfunctioning, unsatisfactory design or unsatisfactory installation of any of the component units of this equipment, or if the material contained in this book is considered inadequate or erroneous, an Unsatisfactory Report, AAF Form No. 54 or a report in similar form shall be submitted in accordance with the provisions of Army Air Force Regulation No. 15-54, listing:

1. Station and organization.
2. Nameplate data (type number and serial number, or complete nomenclature if name plate is not attached to the equipment).
3. Date and nature of failure.
4. Airplane model and serial number.
5. Remedy used or proposed to prevent recurrence.
6. Handbook errors or inadequacies, if applicable.

FOR U. S. NAVY PERSONNEL:

Report of failure of any part of this equipment during its guaranteed life shall be made on NAV. SandA Form 309, "Stub Requisition and Report of Unsatisfactory, Defective, or Damaged Class 16 Material" or a report in similar form and forwarded in accordance with the latest instructions of the Bureau of Aeronautics. Such reports of failure shall include:

1. Reporting Activity.
2. Nameplate Data.
3. Date placed in service.
4. Part which failed.
5. Nature and cause of failure.
6. Remedy used or proposed to prevent recurrence.

FOR BRITISH PERSONNEL:

Form 1022 procedure shall be used when reporting failure of radio equipment.

CONTRACTUAL GUARANTEE

(a) The Contractor guarantees that at the time of delivery thereof the articles provided for under this contract will be free from any defects in material or workmanship and will conform to the requirements of this contract. Except as to vacuum tubes, batteries, rubber and material normally consumed in operation, the equipment, including all spare parts, is guaranteed for a period of one (1) year from the date of its delivery to and acceptance by the Government, with the understanding that all items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f.o.b. any point within the continental limits of the United States designated by the Government, without delay and at no expense to the Government; provided, that such guarantee shall not obligate the Contractor to repair or replace any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and unless the defect is not the result of normal expected shelf life deterioration. This guarantee shall then continue as to corrected or replacing articles or, if only parts of such articles are corrected or replaced, to such corrected or replacing parts, until one year after the date of delivery.

(b) To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design, with the understanding that if ten per cent (10%) or more of the total quantity comprising such item furnished under the contract (but not less than two thereof) is found to be defective as to design, the entire item will be conclusively presumed to be of defective design and shall be subject to one hundred per cent (100%) correction or replacement by a suitably redesigned item.

(c) All defective items will be subject to ultimate return to the Contractor except that the exigencies of the naval service may necessitate expeditious repair of certain items in order to prevent extended interruption of communications and in such cases the return of the defective items for examination by the Contractor prior to repair or replacement shall not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure, will be acceptable as a basis for effecting expeditious adjustment under the provisions of this contractual guarantee.

(d) If the Government does not require correction or replacement of a defective or nonconforming article, the Contractor, if required by the contracting officer within a reasonable time after the notice of defect or nonconformance, shall repay such portion of the contract price as is equitable in the circumstances. Equitable in the circumstances is to be determined by mutual agreement between the Contractor and the contracting officer. Failure to agree to such adjustment shall be a disput concerning a question of fact within the meaning of the section of this contract entitled "Disputes."

(e) Section 9 of the General Provisions, entitled "Guaranty," is hereby superseded and deleted.

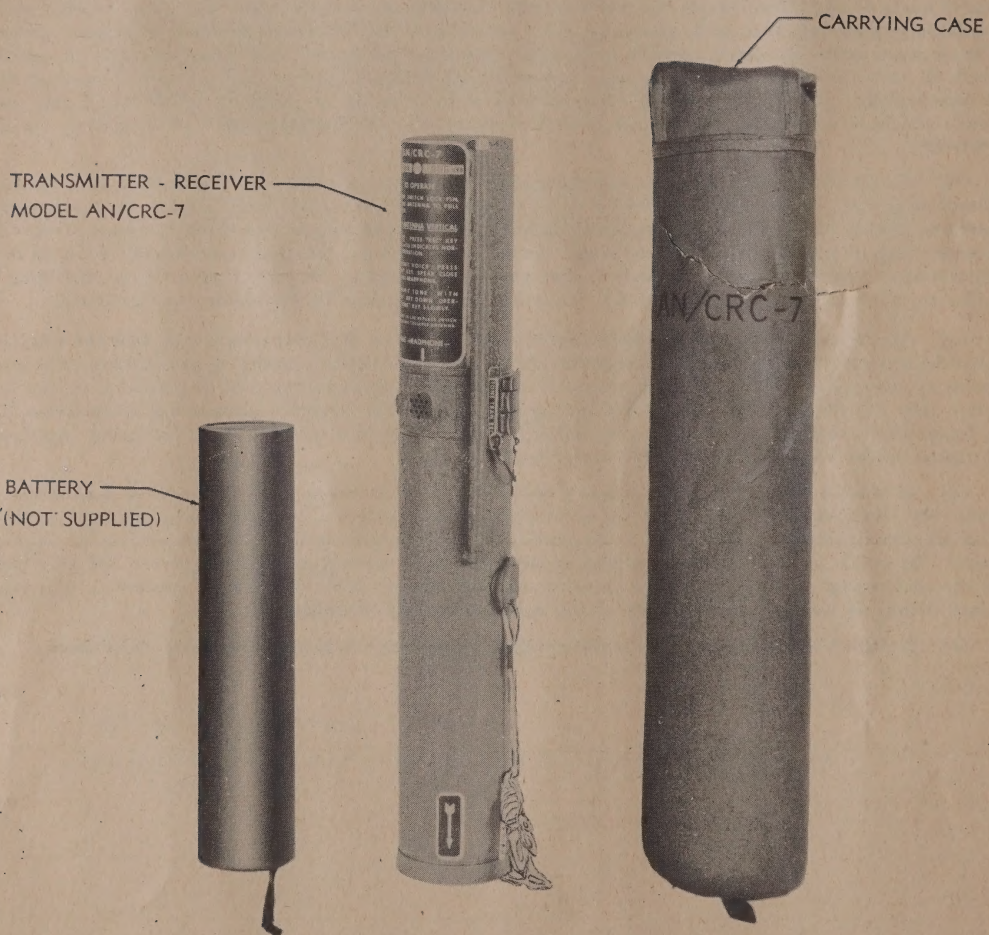


Figure 1-1. VHF Sea Rescue Transmitter—Receiver, Model AN/CRC-7, Components.

SECTION I

GENERAL DESCRIPTION

1. FUNCTION OF EQUIPMENT.

Model AN/CRC-7 VHF Sea Rescue Transmitter-Receiver is used to provide two-way voice communication between personnel on the surface of the ocean and searching air or surface craft. The equipment is also capable of transmitting an MCW signal which may be keyed at a slow rate.

2. EQUIPMENT SUPPLIED.

All the equipment supplied is shown in figure 1-1 and listed in table 1-1.

3. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

The equipment required but not supplied is listed in table 1-2.

4. POWER CONSUMPTION.

All power required for the operation of this equipment is supplied by the battery listed in table 1-2. The current drain at the specified voltages is listed in table 1-3.

5. DESCRIPTION OF EQUIPMENT.

Model AN/CRC-7 VHF Sea Rescue Transmitter-Receiver is mounted in a light-weight watertight brass case which is furnished in a durable grey wrinkle lacquer finish. The general construction and overall dimensions of the unit are shown in figure 4-1. The upper part of the case, which is hermetically sealed, contains the chassis on which all components of the radio transmitter and receiver are mounted. The operating controls, together with the

TABLE 1-1. EQUIPMENT SUPPLIED

Quan. Per Equip.	*Name of Unit*	*Navy Type Designation*	*Overall Dimensions in Inches*	*Weight in Pounds*
1	VHF Sea Rescue Transmitter-Receiver	AN/CRC-7	Length 15.125 Width 2.562	2.5
1	Waterproof cover			

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

Quan. Per Equip.	*Name of Unit*	*Army/Navy Type Designation*	*Required Characteristics*
1	Battery	BA-247/U	Filament voltage 1.3 Plate voltage 91.5

TABLE 1-3. BATTERY POWER CONSUMPTION

Operating Condition	*Battery Life*	*Fil. Volts*	*Fil. Amps*	*Plate Volts*	*Plate Ma.*
Receive	25 hrs.	1.3	.330	91.5	16
Transmit	20 hrs.	1.3	.650	91.5	24-25

microphone-loudspeaker unit, are located directly below the transmitter-receiver chassis. (See figure 3.1.) Operating instructions are stenciled on the equipment as shown in figure 3-2. A neoprene coated fabric diaphragm between the switch operating keys and the switches effectively seals the unit against water entry. A similar diaphragm serves to seal the perforations for the microphone-loudspeaker unit. A 2 or 3-section telescoping type of antenna is installed in a tubular container which is fastened to the side of the unit. (See figure 1-2.) Connection to the antenna is provided through a glass hermetic seal near the top of the unit. A six-prong plug projects into the battery compartment which consists of the lower section of the cylindrical case. The two outer pins are grounded to the case and serve as guide pins for the battery. One of the guide pins serves also as the negative terminal of the "A" battery. A watertight screw cap on the bottom of the unit permits access to the battery compartment.

The AN/CRC-7 transmitter is crystal-controlled, operating on a frequency of 140.58 Mc. The receiver is a super-regenerative type, operating on the same frequency. The equipment is designed to operate with AN/ARC-1 or similar equipment.

The power output is approximately 25 milliwatts with a fresh battery.

Over sea water, communication should be possible with the AN/CRC-7 over the following approximate distances:

2000 ft. elevation—15 miles
5000 ft. elevation—30 miles
10,000 ft. elevation—30 miles

SECTION II

INSTALLATION AND ADJUSTMENT

1. BATTERY INSTALLATION.

To install a battery in the unit, remove the screw cap from the bottom of the unit and insert the battery in the container so that the index arrow on the bottom of the battery lines up with the reference mark on the edge of the battery compartment. Push the battery firmly into the compartment so that the battery receptacle will engage the plug at the top of the battery compartment. Replace the screw cap on the bottom of the unit, screwing it tight enough to insure a good watertight seal.

2. TEST PROCEDURE.

Operate the equipment in accordance with the instructions given in section III, paragraph 4 of this handbook, using two equipments, six to twelve inches apart, with antennas on both equipments in the fully collapsed position. If successful tone transmission can be carried on between the two units, it may be assumed that the equipment is functioning satisfactorily.

Batteries may be tested with the procedure outlined in section V.

SECTION III
OPERATION

Note

Whenever the equipment is to be used in hilly terrain, try to operate from as high a position as possible. The frequency on which this equipment operates is limited essentially to line of sight distances. Any terrain or other large obstacles between the transmitting and receiving points may prevent the signals from coming through.

1. PREPARATION FOR OPERATION.

To prepare the unit for operation, remove the lock pin from the switch keys and extend the antenna by pulling the antenna out to full length. See figure 3-1.

2. RECEIVING SIGNALS.

To receive, press the lowest switch key marked REC, holding the unit in a vertical position with the antenna pointing upward. The MIKE-HEADPHONE opening should be held near the ear. In the absence of signals, a hissing sound indicates normal receiver operation.

3. TRANSMITTING VOICE SIGNALS.

To transmit voice signals, press the middle key marked TRAN. This procedure also depresses the REC key; or if desired, two fingers may be used to operate the equipment, one on each key. The unit must be held with the antenna vertical as described in paragraph 2 above, with the MIKE-HEADPHONE unit held close to the mouth. Speak directly into the unit in a normal voice. When the transmission is complete, release the TRAN key, but keep the REC key depressed for reception of signals. After communication is complete, release both keys.

4. TRANSMITTING TONE.

To transmit steady tone, depress all three keys. If it is desired to key the tone signal, hold the TRAN key depressed and key the TONE key, preferably with the fingers of the hand not holding the unit. Only a very slow keying rate should be attempted.

CAUTION

When the unit is not in use, the key safety pin should be locked in place to prevent accidental operation and discharge of the batteries. The antenna should also be collapsed in its holder to prevent possible damage.

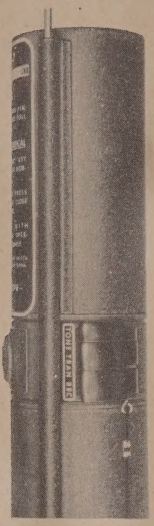


Figure 3-1. VHF Sea Rescue Transmitter-Receiver Model AN/CRC-7, Operating Controls

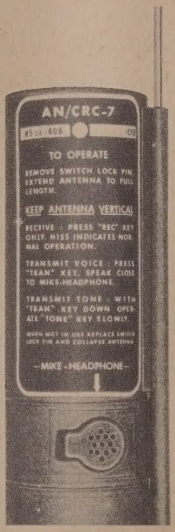

AN/CRC-7
TO OPERATE
REMOVE SWITCH LOCK PIN. EXTEND ANTENNA TO FULL LENGTH.
KEEP ANTENNA VERTICAL
RECEIVE - PRESS "REC" KEY ONLY. HISS INDICATES NORMAL OPERATION.
TRANSMIT VOICE - PRESS "TRAN" KEY. SPEAK CLOSE TO MIKE-HEADPHONE.
TRANSMIT TONE - WITH "TRAN" KEY DOWN OPERATE "TONE" KEY SLOWLY.
WHEN NOT IN USE REPLACE SWITCH LOCK PIN AND COLLAPSE ANTENNA
MIKE-HEADPHONE

Figure 3-2. VHF Sea Rescue Transmitter-Receiver Model AN/CRC-7, Operating Instructions

SECTION IV

SUPPLEMENTARY DATA

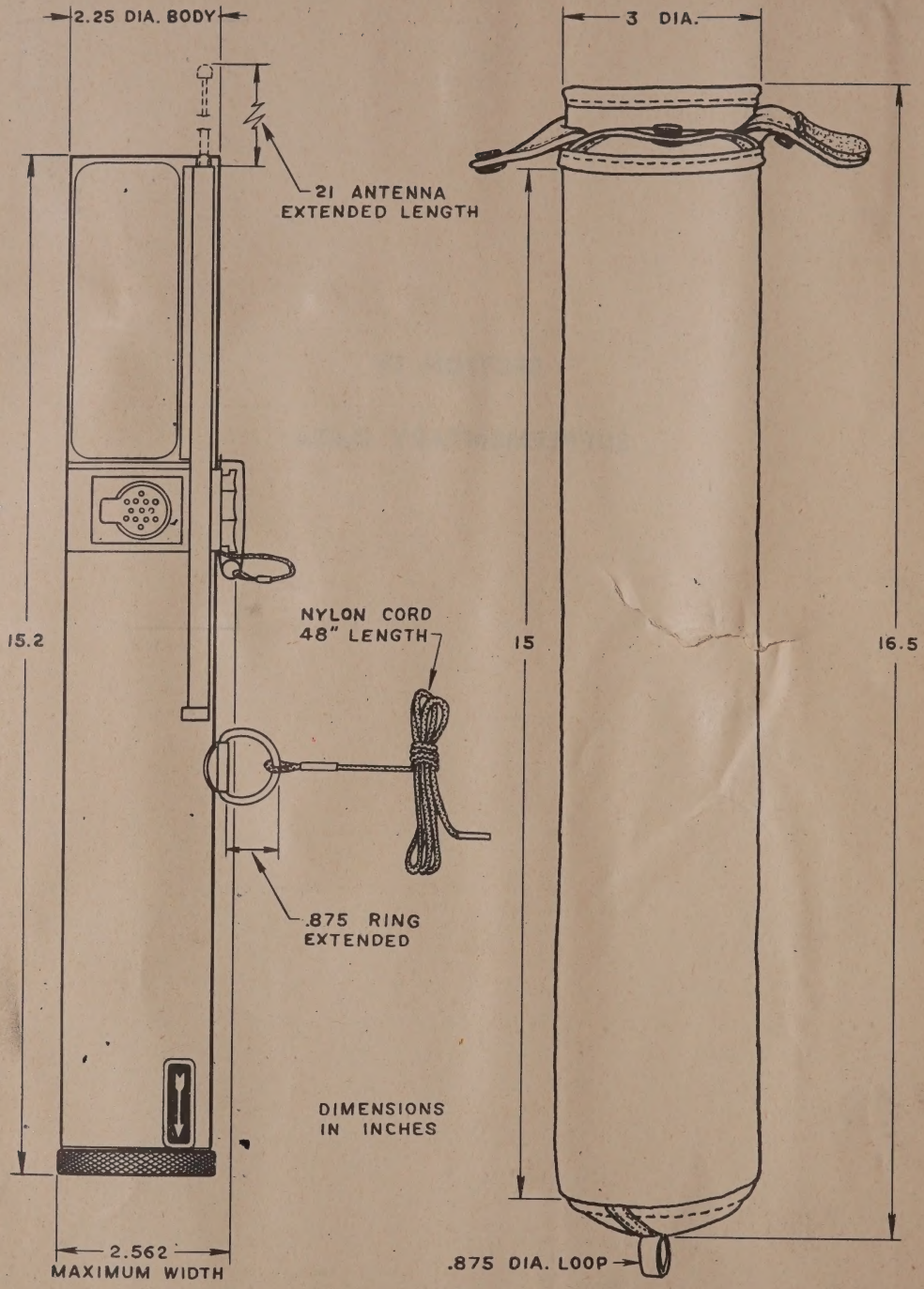
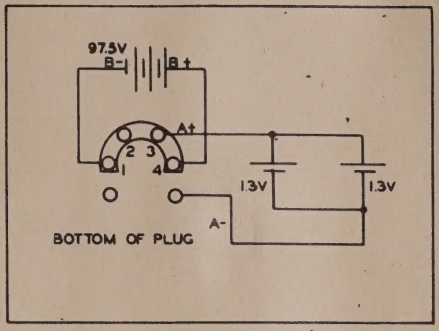


Figure 4-1. VHF Sea Rescue Transmitter-Receiver, Model AN/CRC-7, Outline Dimensions

MFD

MFD



PACITANCES IN MICROMICROFARADS
OTHERWISE NOTED.
SISTANCES IN OHMS
OTHERWISE NOTED.

VHF Sea Rescue Transmitter-Receiver
CRC-7, Schematic Wiring Diagram

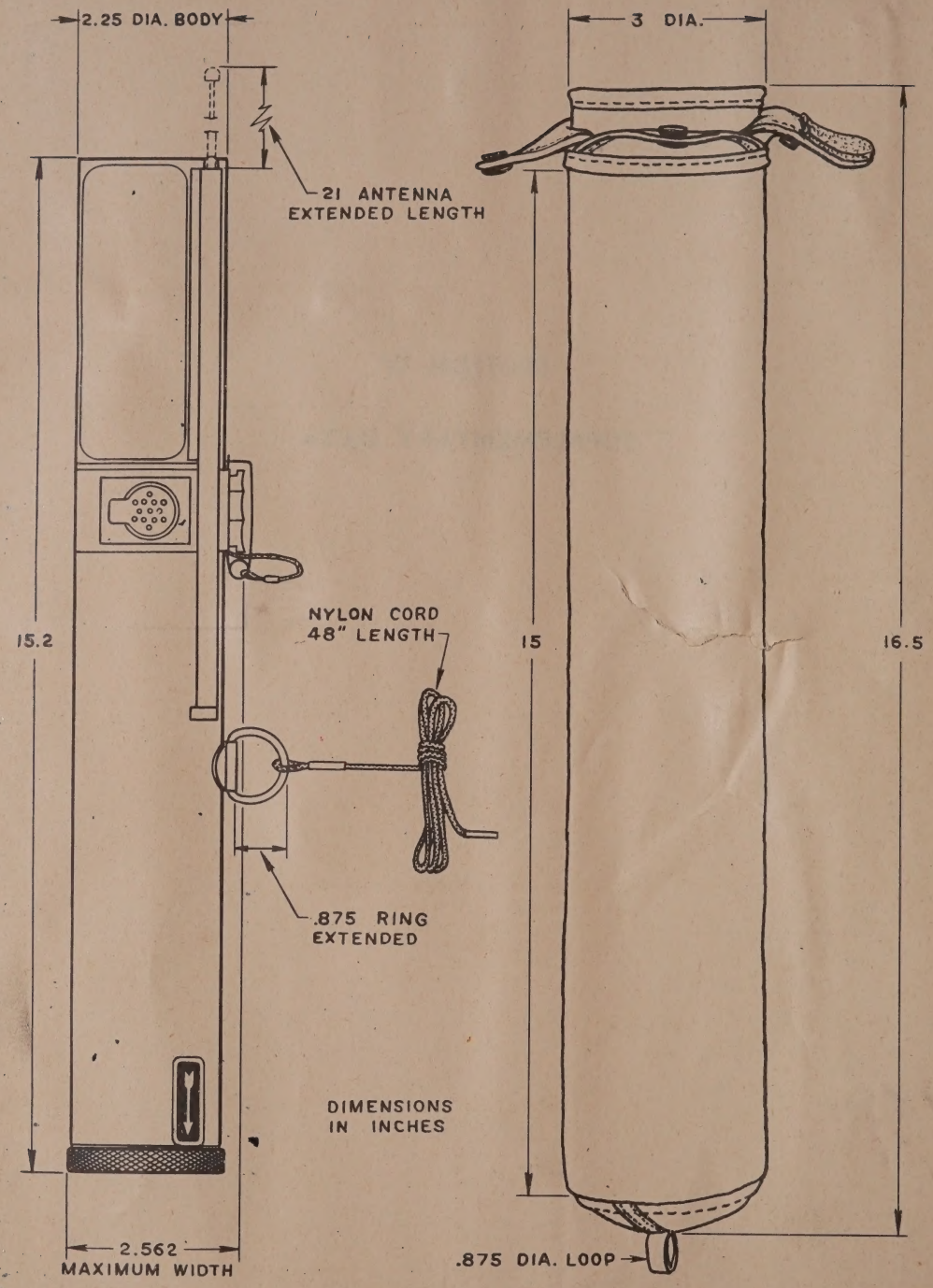


Figure 4-1. VHF Sea Rescue Transmitter-Receiver, Model AN/CRC-7, Outline Dimensions

RESTRICTED
AN 16-30CRC7-2

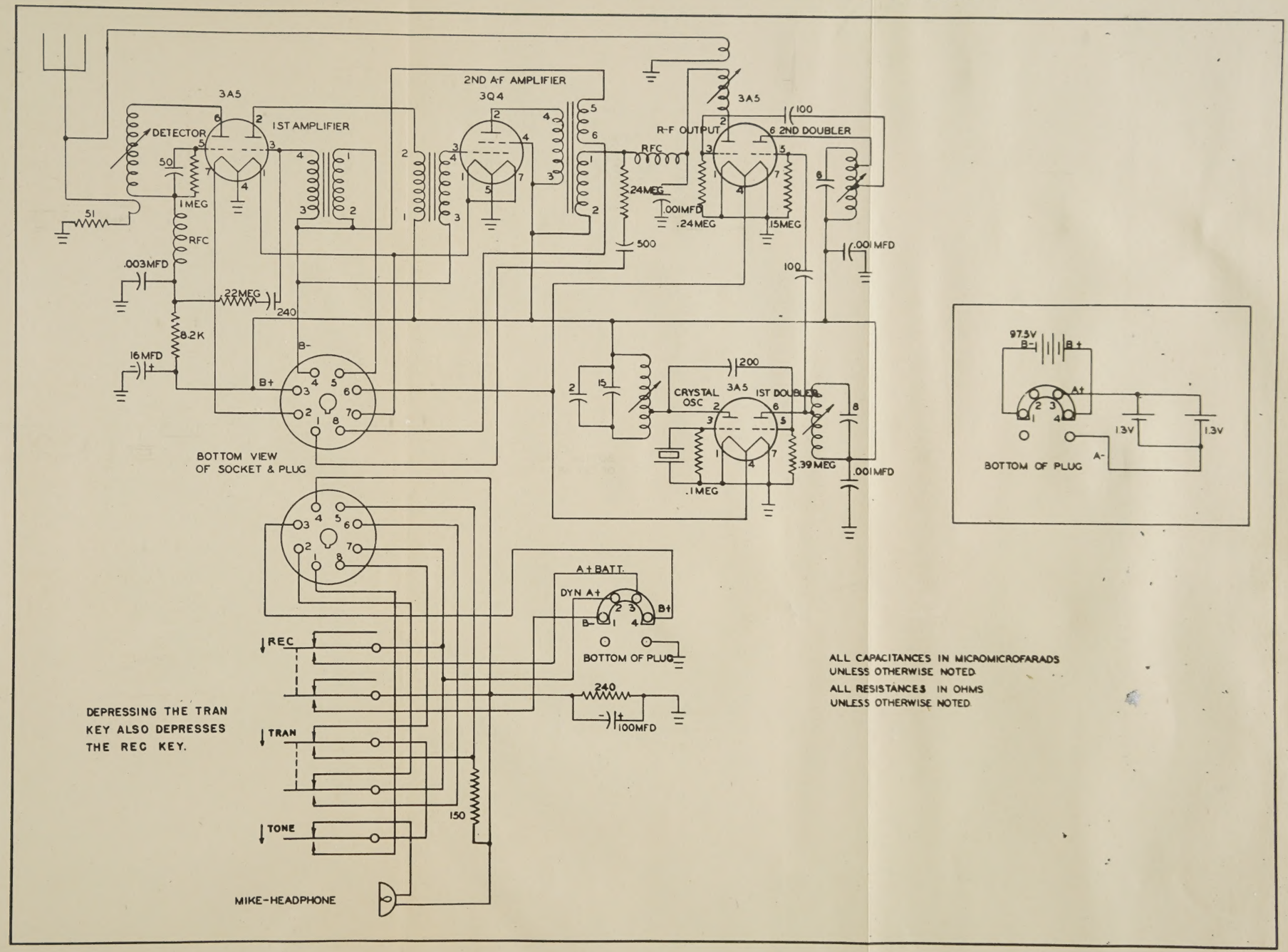


Figure 4-2. VHF Sea Rescue Transmitter-Receiver Model AN/CRC-7, Schematic Wiring Diagram

RESTRICTED

SECTION V

EMERGENCY OPERATION AND REPAIR

1. REMOVAL OF BATTERY.

To remove the battery from the unit, unscrew the cap at the bottom of the unit and pull the battery out of the battery compartment.

2. CHECKING BATTERIES.

The batteries should be checked periodically using the following equipment:

Voltmeter: 0-150, 200 or 250 volt dc range, 1000 ohms/volt or greater.

Voltmeter: 0-2, 2.5 or 5 volt dc range

Resistor: 4300 (±100) ohms, 5 watts

Resistor: 2 (−0.0 +0.2) ohms, 2 watts

Leads: Flexible leads with test prods

a. "A" TEST: Connect the two-ohm resistor across the low range voltmeter and connect leads with test prods to the voltmeter. Insert the + (positive) lead in contact number 3 and the - (negative) lead in the contact to the left of contact number 4. (This contact serves as a receptacle for the guide pin as well as the negative terminal of the "A" battery.) If the battery is new, the voltage should be 1.28 to 1.3 volts. Replace the battery if the reading is 1.1 volts or less, after one minute under load.

b. "B" TEST: Connect the 4300-ohm resistor across the high range voltmeter and connect the leads with test prods to the voltmeter. Insert the positive prod into socket contact number 4 and the negative prod into contact number 1. If the battery is new, the voltage should read 91 to 93 volts. Replace the battery if the reading is 80 volts or less, after one minute under load.

3. MAINTENANCE.

Since the AN/CRC-7 is hermetically sealed, no maintenance is to be attempted in the field.